The Regents of the University of California

COMMITTEE ON OVERSIGHT OF THE DEPARTMENT OF ENERGY LABORATORIES
July 18, 2013

The Committee on Oversight of the Department of Energy Laboratories met on the above date at UCSF–Mission Bay Community Center, San Francisco.

Members present: Regents Blum, De La Peña, Gould, Island, Newsom, Pattiz, Reiss, Schultz, and Zettel; Ex officio members Varner and Yudof; Advisory member Powell

In attendance: Regents Feingold, Flores, Kieffer, Makarechian, and Ruiz, Regents-designate Engelhorn, Leong Clancy, and Saifuddin, Faculty Representative Jacob, Associate Secretary Shaw, General Counsel Robinson, Chief Compliance and Audit Officer Vacca, Provost Dorr, Executive Vice President Brostrom, Senior Vice Presidents Dooley and Stobo, Vice Presidents Beckwith, Lenz, and Sakaki, Chancellors Block, Blumenthal, Desmond-Hellmann, Dirks, Drake, Katehi, Khosla, and Yang, Acting Chancellor Conoley, and Recording Secretary McCarthy

The meeting convened at 10:45 a.m. with Committee Chair Pattiz presiding.

1. **APPROVAL OF MINUTES OF PREVIOUS MEETING**

Upon motion duly made and seconded, the minutes of the meeting of May 15, 2013 were approved.

2. **UPDATE ON THE DEPARTMENT OF ENERGY LABORATORIES**

[Background material was provided to Regents in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Committee Chair Pattiz said he had congratulated Ernest Moniz on his confirmation as Secretary of Energy and looks forward to meeting with him. Ten National Laboratory researchers were recently selected by the Department of Energy (DOE) for the 2013 DOE Early Career Research Program; four of the awardees received their degrees from UC campuses and two have joint UC Berkeley and Lawrence Berkeley National Laboratory (LBNL) appointments.

Committee Chair Pattiz introduced Los Alamos National Laboratory (LANL) Principal Associate Director for Science, Technology, and Engineering Alan Bishop. Mr. Bishop said that LANL is celebrating its 70th year contributing to the nation's security, including energy security in a world of finite resources. Climate change is an important aspect of the interplay between energy and environment, security and infrastructure. LANL

conducts extensive research and development in energy and climate, particularly in climate impacts. While discussions on the origins of climate change continue to be robust, Mr. Bishop said that significant temperature increases in generational timescales are a fact. He introduced LANL staff scientist Nate McDowell and postdoctoral fellow Park Williams to discuss forest mortality, particularly in the American Southwest, induced by these temperature increases. Mr. Bishop characterized their research as scholarly and sobering.

Mr. McDowell said that UC campuses, including UC Irvine, UC Berkeley, UC Santa Cruz, and UC Santa Barbara, and LBNL made significant contributions to the content he would present. He summarized that rising temperatures, which will likely continue to rise at least until the lifetimes of his generation's great grandchildren, are arguably the main culprit killing forests and increasing the rate of forest mortality. In particular, in the southwestern United States, two independent assessments suggest that by 2050 nearly all conifer forests will be gone from that area, with large-scale consequences.

The Intergovernmental Panel on Climate Change has identified potential tipping points of climate change. For example, this panel has said that if the Amazon Rainforest or the Boreal Forest in Canada is lost in a significant manner, they would release carbon dioxide into the atmosphere rather than take carbon dioxide from the atmosphere, causing the atmosphere to warm more quickly. Mr. McDowell displayed a slide showing a map of locations in the United States where pathogens have attacked forests since 1997 and long-term observations of increasing forest mortality. Forest mortality has doubled or tripled throughout the western United States. Mr. McDowell explained that since trees and plants cannot move to find water, they adapt to higher temperatures by closing the stomata on their leaves to stop losing water. However, since carbon dioxide enters through the same stomata, the trees cannot eat. Computer simulations suggest that the southwestern U.S. will lose the vast majority of its forests by 2050 and that forest mortality is likely throughout the northern hemisphere by 2100. In collaboration with UC Santa Cruz, LANL is conducting a study of how plants die when exposed to increased temperatures in order to improve predictive models.

Mr. Williams said that during the past century in the southwestern United States temperatures have risen rapidly and precipitation has remained the same, making it an excellent area to study how warming affects the forests. Mr. Williams showed a graph detailing the regional forest growth record for the past 100 years derived from tree-ring records from thousands of trees. Tree growth is strongly correlated with winter precipitation; wetter winters lead to better tree growth. There is a negative correlation between atmospheric dryness, driven by temperature, and tree growth; when atmospheric dryness increases, tree growth decreases. These correlations among tree growth, precipitation, and atmospheric dryness enable predictions of future forest growth and death. Mr. Williams showed another graph demonstrating an exponential relationship between atmospheric dryness and forest fires since 1984. When atmospheric dryness increases incrementally, the area burned by forest fires increases exponentially. He predicted an increase in very large forest fires in the Southwest as temperatures and atmospheric dryness increase. He showed a sequence of maps showing indicating areas

of wildfires around Los Alamos, New Mexico, from the 1970s to the present, and maps showing forest and wildfire areas and bark beetle infestations in Arizona and New Mexico. Bark beetles can kill tress, making them more susceptible to wildfires.

Comparing current droughts to those of the past, Mr. Williams said that, although the current drought in the Southwest is the largest in 400 years, there have been larger droughts in the past that had big effects on forests and human civilization. Using historical data, one can predict that the Southwest would continue to have periods of strong droughts and periods of wet cool conditions. However, climate models suggest that warming conditions would cause a trend toward increased atmospheric dryness. He showed a graph of data using model projections of precipitation and atmospheric dryness to predict a decline in forest growth in the next century. These predictions show that by the middle of the next century, climate during an average year would produce forest growth equal to or worse than growth during megadroughts during the early part of this century. Mr. Williams predicted that by the middle of this century Southwest forests would either be gone or composed of entirely different species. He said the Southwest is predictive of what will happen in other areas as they warm. In conclusion, he summarized that rising temperatures are killing forests in many places around the globe and will have vast consequences for climate, food, health, and society.

Committee Chair Pattiz agreed that this research is sobering and could be used to bring attention to concerns about climate change. He encouraged students to help focus attention on these issues.

Regent Zettel expressed her concern about climate change and her appreciation for the presentation. She asked if research is being conducted to find suitable substitute plantings for deforested areas. Mr. McDowell said that while some research in this area has been conducted by the forestry community, much more research would be beneficial.

Regent Blum expressed concern about beetle infestations and fires in forests at Lake Tahoe. He said that UC Davis and UC Riverside have been working to develop plants more suited for a warmer climate and asked if the LANL researchers are involved with this work. He also asked what causes beetle infestation. Mr. McDowell said LANL is working with UC Irvine at the current time, but not with the Davis or Riverside campuses on these issues. Regent Blum urged more collaboration with these campuses. Mr. McDowell said that the cause of beetle infestations is not completely known, but in general warmer temperatures result in stress on trees, making them more vulnerable to insect damage. If the beetle population gets a foothold in a few stressed trees, its population can increase to a level capable of attacking even healthy trees. Severe cold temperatures can stop the beetles. Mr. Williams added that, even if the amount of precipitation does not change, as temperatures warm less precipitation would be stored as snow pack and more would run off as water. A decreased snow pack would reduce the amount of water available to trees during their growing season.

Regent Makarechian characterized the presentation as eye-opening and frightening. He asked for a presentation at a future meeting about the effect of climate change on

California's food and wine production. Mr. Williams said that much is still unknown about the potential effects of climate change on the California agricultural industry because of uncertainties about future regional climate differences.

Regent Reiss also expressed appreciation for the presentation. She said that 25 years prior scientists spoke of a window of opportunity for prevention of global warming; now scientists talk more about adaptations to climate change. She stated that conclusions drawn by the Intergovernmental Panel on Climate Change in the draft of its upcoming 5-year report were stunning, but have received little attention. Regent Reiss urged students to show leadership on this issue. The climate research being conducted throughout UC is significant. She encouraged the Regents to find ways to do more to encourage action.

Regent-designate Saifuddin encouraged the Regents to consider the student movement for divestment from investments in fossil fuel industries.

Mr. Bishop said that Secretary of Energy Moniz has set climate impact as one of his major priorities.

Regent Newsom spoke of the unique status UC has in relation to the National Laboratories to bring evidence-based science to bear on changing the way energy is produced and consumed. UC has led by example through its extraordinary work in sustainability. New opportunities will exist to work with Governor Brown around Proposition 39 funds, which will be directed to clean energy projects. UC is uniquely positioned to help prioritize where those funds should be spent.

3. **RESOLUTIONS TO EXCLUDE ACCESS TO FEDERAL CLASSIFIED INFORMATION**

The President recommended that the four resolutions pertaining to the University's Department of Energy and Department of Defense Facility Security Clearances be approved as shown in Attachments 1-4.

[Background material was provided to Regents in advance of the meeting, and a copy is on file in the Office of the Secretary and Chief of Staff.]

Committee Chair Pattiz said that this routine matter to conform to Regents Policy on Security Clearance for Access to Federal Classified Information proposes adoption of exclusion resolutions, who may apply for clearance if they choose: alumni Regents Feingold and Schultz, student Regent Flores, and Vice Chair of the Academic Senate Gilly.

Upon motion duly made and seconded, the Committee approved the President's recommendation and voted to present it to the Board.

The meeting adjourned at 11:35 a.m.

Attest:

Associate Secretary

ATTACHMENT 1

RESOLUTION

Pursuant to the *Policy on Security Clearance for Access to Federal Classified Information* adopted on March 29, 2012 and this Resolution, the following named member of the Board of the University of California shall not require, shall not have, and can be effectively excluded from access to all classified information and/or special nuclear material released to the Regents of the University of California until such individual is granted the required access authorization from the cognizant security agency. And, as a consequence of this Resolution, such individual does not occupy a position that would enable him to adversely affect the policies or practices of the University of California, or its subsidiary, regarding the performance of classified contracts for the United States Government.

NAME	TITLE
Kenneth Feingold	Regent

ATTACHMENT 2

RESOLUTION

Pursuant to the *Policy on Security Clearance for Access to Federal Classified Information* adopted on March 29, 2012 and this Resolution, the following named member of the Board of the University of California shall not require, shall not have, and can be effectively excluded from access to all classified information and/or special nuclear material released to the Regents of the University of California until such individual is granted the required access authorization from the cognizant security agency. And, as a consequence of this Resolution, such individual does not occupy a position that would enable her to adversely affect the policies or practices of the University of California, or its subsidiary, regarding the performance of classified contracts for the United States Government.

NAME	TITLE
Cinthia Flores	Regent

ATTACHMENT 3

RESOLUTION

Pursuant to the *Policy on Security Clearance for Access to Federal Classified Information* adopted on March 29, 2012 and this Resolution, the following named member of the University of California Key Management Personnel shall not require, shall not have, and can be effectively excluded from access to all classified information and/or special nuclear material released to the Regents of the University of California until such individual is granted the required access authorization from the cognizant security agency. And, as a consequence of this Resolution, such individual does not occupy a position that would enable her to adversely affect the policies or practices of the University of California, or its subsidiary, regarding the performance of classified contracts for the United States Government.

NAME	TITLE
Mary Gilly	Vice Chair of the Academic Senate

ATTACHMENT 4

RESOLUTION

Pursuant to the *Policy on Security Clearance for Access to Federal Classified Information* adopted on March 29, 2012 and this Resolution, the following named member of the Board of the University of California shall not require, shall not have, and can be effectively excluded from access to all classified information and/or special nuclear material released to the Regents of the University of California until such individual is granted the required access authorization from the cognizant security agency. And, as a consequence of this Resolution, such individual does not occupy a position that would enable him to adversely affect the policies or practices of the University of California, or its subsidiary, regarding the performance of classified contracts for the United States Government.

NAME	TITLE
Van Schultz	Regent